

# **METHOD FOR PRODUCING A HIGH QUALITY USEFUL LAYER ON A SUBSTRATE**

## **ABSTRACT**

A method for producing a high quality useful layer of semiconductor material on a substrate. The method includes implanting at least two different atomic species into a face  
5 of a donor substrate to a controlled mean implantation depth to form a weakened zone therein and to define a useful layer. The implanting step is conducted to minimize low-frequency roughness at the weakened zone. Next, the method includes bonding a support substrate to the face of the donor substrate, and detaching the useful layer from the donor substrate along the weakened zone. A structure is thus formed that includes the useful  
10 layer on the support substrate with the useful layer presenting a surface for further processing. The technique also includes thermally treating the structure to minimize high-frequency roughness of the surface of the useful layer. The result is a surface having sufficient smoothness so that chemical mechanical polishing (CMP) is not needed.

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